Timing of Insurance Coverage and Use of Prenatal Care Among Low-Income Women

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Objectives. This study examined the relationship between timing of insurance coverage and prenatal care among low-income women.

Methods. Timeliness of prenatal care initiation and adequacy of number of visits were studied among 5455 low-income participants in a larger cross-sectional statewide survey of postpartum women in California during 1994–1995.

Results. Although only 2% of women remained uninsured throughout pregnancy, one fifth lacked coverage during the first trimester. Rates of untimely care were highest (≥64%) among women who were uninsured throughout their pregnancy or whose coverage began after the first trimester; rates were lowest (about 10%) among women who obtained coverage during the first trimester. Women who first obtained Medi-Cal coverage during pregnancy were at low risk of having too few visits.

Conclusions. Timing of prenatal coverage should be considered in research on the relationship between coverage and care use among low-income women. Earlier studies that relied solely on principal payer information, without data on when coverage began, may have led to inaccurate inferences about lack of coverage as a barrier to prenatal care. (*Am J Public Health.* 2002;92:423–427)

During the 1980s, federal legislation was enacted to markedly expand eligibility for maternity care coverage under the Medicaid program. In 1986, the average Medicaid eligibility income threshold for maternity care was approximately 55% of the federal poverty level[1]; by 1990, pregnant women with incomes up to 133% of the federal poverty level were eligible for Medicaid coverage in all states, and several states had raised the eligibility cutoff to 185% of the poverty level or higher.[1,2] In many states, the eligibility expansions also addressed previous obstacles arising from features of the Medicaid system itself through efforts such as placing eligibility workers at prenatal care sites, streamlining application and certification procedures, and making Medicaid participation more attractive to obstetric providers.

Policies expanding Medicaid eligibility for maternity care coverage were based on the premise that reducing the number of uninsured pregnant women would lead to improved access to prenatal care. However, several large studies that assessed the impact of expansions in public coverage did not reveal significant improvements in the use of prenatal care despite reductions in the proportions of uninsured pregnant women.[3–5] In an earlier study using 1990 statewide California birth certificate data (within 2 years of major eligibility expansions in that state), we found elevated rates of untimely care among women with Medi-Cal (California's Medicaid program) as their primary prenatal care payer, even in comparison with uninsured women.[6]

Findings from these studies have prompted widespread doubts about the extent to which lack of insurance coverage is a crucial barrier. However, all of the studies relied on secondary data sources that did not include information on the point during pregnancy at which a woman's coverage began. Birth certificate data in several states currently include information on the principal prenatal care payer, defined as the third-party payer that at the time of delivery is expected to have contributed most to a woman's prenatal care expenses, regardless of when the coverage began. Although lack of insurance coverage during the first trimester of pregnancy (as opposed to later coverage status) could logically be viewed as the relevant issue in assessing potential financial barriers to first-trimester initiation of prenatal care, only women who lack third-party coverage throughout their pregnancies are classified as "uninsured" according to principal prenatal payer information.

We found 2 earlier studies that examined the relationship between timing of coverage during pregnancy and use of prenatal care. Linking records from birth certificates, hospital discharge abstracts, and Medicaid enrollment files in Washington State before the major expansions in Medicaid eligibility, Katz et al.[7] found that both women who enrolled in Medicaid after their first trimester of pregnancy and those who had Medicaid coverage before pregnancy were at elevated risk of inadequate prenatal care, whereas women who obtained Medicaid coverage during their first trimester were not. The authors controlled for age, marital status, and gravidity but lacked information on factors such as income, education, language, transportation, child care, and women's knowledge and attitudes that might have explained the observed relationships between timing of coverage and use of care. After adjusting for a number of systems and personal characteristics, Gazmararian et al.[8] found (without distinguishing trimester of enrollment) that low-income women who enrolled in a managed care plan in Tennessee during their pregnancy were more likely to initiate care after the first trimester than were women who enrolled before they became pregnant.

The present study analyzed data from a statewide survey of access to maternity care conducted in California during 1994–1995, approximately 5 years after eligibility for Medicaid coverage of maternity care was expanded to include women with family incomes up to 200% of the federal poverty level. Our main objective was to describe the relationship between third-party coverage and the use of prenatal care after implementation of the major Medi-Cal eligibility expansions, taking into account both timing of coverage and other important factors that might have influenced women's use of prenatal care. We focused on women with family incomes at or below 200% of the federal poverty level, all

of whom were thus eligible for Medi-Cal prenatal care coverage. Findings from an earlier study indicated that inadequate use of prenatal care is rare among women in higher income groups.[9]

METHODS

Women who participated in this study were part of a larger statewide survey of more than 10 000 postpartum women interviewed from August 1994 through July 1995 during their delivery stays at 19 California hospitals; the survey methods have been described previously,[9] and a detailed technical appendix is available on request. Women were eligible for the larger study if they had delivered a live-born infant during their hospital stay, spoke English or Spanish, were at least 15 years of age (and legally emancipated if younger than 18 years), and had not been incarcerated during their pregnancy; they were ineligible if nursing staff believed that undergoing an interview would interfere with their care.

On the basis of these criteria, nearly 93% of women delivering at the study hospitals during the study period were eligible to participate, and completed interviews were obtained from 86% of eligible women who were approached by interviewers. The overall weighted sample appeared to be representative of the statewide delivery population.[9] We examined a subsample of 5455 surveyed women selected because they lived in California during their first trimesters, were 18 years or older when interviewed, had family incomes at or below 200% of the poverty level, and were uninsured throughout their pregnancy or had Medi-Cal or private insurance as their principal prenatal payer.

We examined 2 measures of prenatal care use, both based on women's self-reports; comparison of these measures with hospital medical chart information indicated close correspondence in general but suggested that medical charts sometimes failed to note care received from prenatal providers other than the most recent one. *Timeliness of care initiation* reflected the point at which women reported initiating prenatal care, excluding visits involving only pregnancy testing. Care was timely if the initial visit occurred during the first trimester and untimely otherwise (including no prenatal care).

Adequacy of number of prenatal care visits, as defined by Kotelchuck,[10] was determined by comparing a woman's self-reported number of visits with the recommended number of visits for the time she was in care (from first visit to delivery). This measure was examined only among women who actually initiated prenatal care. Women with either an "adequate" or "adequate plus" number of visits according to Kotelchuck's index were classified as having an adequate number of visits, and those with either an "intermediate" or "inadequate" number of visits were classified as having a less than adequate number of visits.

Women were asked to name any third-party health insurance coverage they had just before or during pregnancy (or both) and to specify the timing and duration of each coverage type during pregnancy. *Principal payer for prenatal care* was defined as the insurance provider that contributed most to a woman's prenatal care expenses, regardless of when in pregnancy coverage began; women who received no prenatal care were asked to identify any insurance they had during pregnancy that would have covered prenatal care. Three principal prenatal payer categories were defined: uninsured throughout pregnancy, MediCal (including private coverage purchased by MediCal), and private coverage (including capitated and fee-for-service coverage except that paid for by MediCal). Women with MediCal or private insurance as their principal payer were further grouped according to *timing of coverage*: women whose coverage began before and continued during pregnancy ("continuous" coverage) and women who lacked prepregnancy coverage but obtained coverage during their first, second, or third trimester.

On the basis of self-reported information, women were categorized according to family income (≤100% or 101%–200% of the 1994 federal poverty level), age (18–19 or ≥20 years), education (less than high school, high school or equivalent, or more than high school), parity (primiparous or multiparous), marital status (married or unmarried), language (English spoken or not spoken at home), and primary racial/ethnic identification (African American, Asian/Pacific Islander, European/Middle Eastern, Latina/Hispanic, or other). We also gathered information on other maternal characteristics that, according to the literature, could reflect barriers to prenatal care apart from third-party coverage, including whether a woman (1) had problems with transportation to her prenatal care site, (2) had problems with child care during the pregnancy, (3) had initial feelings of ambivalence or unhappiness about the pregnancy, (4) had not been attempting to become pregnant, (5) had not known that prenatal care should begin early, (6) had no regular source of health care before the pregnancy, and (7) had smoked during the pregnancy. Delivery hospital was included as a marker of characteristics of systems or geographic areas that might influence use of care.

In unadjusted analyses, we first examined distributions of insurance coverage at different time periods in relation to pregnancy. We then examined the unadjusted association between coverage and use of care, determining the percentages of women with untimely prenatal care and with a less than adequate number of visits according to principal prenatal payer and, among those with some coverage, the point at which coverage began. We used logistic regression models to obtain adjusted estimates of the association between coverage (categorized by type and timing of coverage considered jointly) and use of prenatal care; women with continuous private coverage were the reference group. We controlled for the earlier-described sociodemographic and other characteristics that had the potential to affect both insurance coverage and use of care. All analyses involved weighted data and were conducted with SAS (version 6.12)[11] and SUDAAN[12] software.

RESULTS

Table 1 describes insurance coverage among low-income women just before pregnancy and during each trimester. Nearly half (45%) of these women were uninsured just before pregnancy, and one fifth (21%) were uninsured throughout their first trimester. The percentages of low-income women without coverage decreased to 6% and 2% during the second and third trimesters, respectively. The percentage of women covered by Medi-Cal increased markedly over the 4 time

TABLE 1—Insurance Distributions for Low-Income Childbearing Women at Different Time Periods Relative to Pregnancy: California, 1994–1995 (n = 5455)

Insurance Coverage During Specified Time Period	Time Period			
	Just Before Pregnancy, No. (%)	First Trimester, No. (%)	Second Trimester, No. (%)	Third Trimester, No. (%)
Uninsured	2447 (45)	1144 (21)	351 (6)	123 (2)
Medi-Cal	1559 (29)	2802 (51)	3553 (65)	3765 (69)
Privately insured	1449 (27)	1509 (28)	1551 (28)	1567 (29)

Note. Column percentages may not total 100% owing to rounding.

periods. Twenty-nine percent of low-income women had Medi-Cal coverage before pregnancy, with coverage rates increasing to 51% and 65% during the first and second trimesters, respectively; by the third trimester of pregnancy, 69% of the women had Medi-Cal coverage. The percentage of women covered by private insurance was relatively constant, increasing slightly from 27% just before pregnancy to 29% during the third trimester.

As revealed in the unadjusted findings presented in Table 2, timeliness of prenatal care initiation varied markedly by principal prenatal payer. Overall, 74% of uninsured women, 36% of those with Medi-Cal during pregnancy, and 17% of those with private insurance during pregnancy had no prenatal care in the first trimester. Differences by principal payer in the adequacy of number of prenatal care visits were less striking. The percentage of women with a less than adequate number of visits after initiating care appeared to vary by whether the respondent had any coverage during pregnancy but not by whether the principal payer was Medi-Cal or private insurance; 28% of uninsured women had a less than adequate number of visits, in comparison with 16% and 17% of women with Medi-Cal and private insurance as their principal payers, respectively.

Unadjusted results displayed in Table 2 also indicate striking differences in timeliness of care when type and timing of prenatal coverage were considered jointly. In both the Medi-Cal and private insurance principal payer groups, rates of untimely initiation of care appeared to be highest among previously uninsured women who had no coverage until after the first trimester of pregnancy and lowest for women who first obtained coverage during the first trimester; women with continuous coverage appeared to be at intermediate risk of untimely care. Among women with Medi-Cal as their principal prenatal payer, 66% of those without coverage during the first trimester had no first-trimester prenatal visits, as compared with 9% of those who obtained coverage during the first trimester and 39% of those with continuous coverage. Among low-income women with private insurance as their principal payer, 64% of those whose coverage began after the first trimester, 10% of those whose coverage began during the first trimester, and 16% of those with continuous private coverage

TABLE 2—Prenatal Care Use Among Low-Income Childbearing Women, by Principal Prenatal Payer and Timing of Coverage Relative to Pregnancy: California, 1994–1995 (n = 5455)

Principal Prenatal Payer	Principal Payer and Timing of Coverage	No. (% of Principal Payer Group)	Prenatal Care Use			
			Timeliness of Initiating Care		Adequacy of Number of Visits	
			Untimely Care,[a] %	Adjusted OR[b] (95% CI)	Less Than Adequate Number of Visits,[c] %	Adjusted OR[d] (95% CI)
Uninsured		123 (100)	74	4.24 (2.21, 8.13)	28	1.60 (0.66, 3.85)
Medi-Cal	Principal payer (regardless of timing)	3765 (100)	36	. . .	16	. . .
	Medi-Cal began before pregnancy	1559 (41)	39	1.67 (0.84, 3.32)	22	0.90 (0.44, 1.82)
	Medi-Cal began during 1st trimester	1243 (33)	9	0.31 (0.13, 0.74)	11	0.48 (0.34, 0.69)
	Medi-Cal began during 2nd or 3rd trimester	963 (26)	66	7.08 (4.37, 11.47)	13	0.56 (0.38, 0.82)
Private	Principal payer (regardless of timing)	1567 (100)	17	. . .	17	. . .
	Private coverage began before pregnancy	1449 (92)	16	1.00	17	1.00
	Private coverage began during 1st trimester	60 (4)	10	0.43 (0.24, 0.76)	26	1.44 (0.23, 8.97)
	Private coverage began during 2nd or 3rd trimester	58 (4)	64	8.00 (3.26, 19.62)	14	0.90 (0.54, 1.48)

Note. OR = odds ratio; CI = confidence interval.
[a]Prenatal care beginning after the 1st trimester or no prenatal care.
[b]Odds of untimely care in coverage group as compared with continuous private coverage group, adjusted for income, age, education, parity, marital status, language spoken at home, race/ethnicity, transportation or child-care problems, ambivalence–unhappiness about pregnancy, not trying to become pregnant, not knowing prenatal care should start in 1st trimester, lack of a regular source of prepregnancy care, smoking, and delivery hospital; n = 5220 women with information on all variables.
[c]Defined as those with either an "inadequate" or "intermediate" numbers of visits according to Kotelchuck's index[10]; n = 5268 women with some prenatal care.
[d]Odds of less than adequate number of visits in coverage group as compared with continuous private coverage group, adjusted for same variables as above except not knowing prenatal care should start in 1st trimester and lack of a regular source of prepregnancy care; n = 5185 women with some prenatal care and information on all variables.

had untimely initiation of care. No consistent pattern was seen in the adequacy of number of visits by type and timing of coverage; however, the percentages of women who had a less than adequate number of visits appeared lowest (ranging from 11% to 13%) among those who obtained Med-Cal coverage at any time during their pregnancy.

These findings generally persisted after sociodemographic and other characteristics had been controlled (Table 2). Women who remained uninsured throughout their pregnancy were 3 times as likely as women with continuous private insurance to have had untimely initiation of prenatal care (adjusted odds ratio [OR]=4.24, 95% confidence interval [CI]=2.21, 8.13). Previously uninsured women who obtained either Medi-Cal or private coverage after their first trimester also were at a significantly elevated risk of untimely care (adjusted OR=7.08, 95% CI=4.37, 11.47, for women with Medi-Cal; adjusted OR=8.00, 95% CI=3.26, 19.62, for women with private coverage).

As seen in the unadjusted results, previously uninsured low-income women who obtained either Medi-Cal (adjusted OR=0.31, 95% CI=0.13, 0.74) or private coverage (OR=0.43, 95% CI=0.24, 0.76) during their first trimester again appeared to have lower risks of untimely initiation, even in comparison with low-income women who had continuous private coverage. A woman's likelihood of having a less than adequate number of visits appeared to be less strongly associated with type and timing of coverage than was her likelihood of untimely initiation. However, women who obtained MediCal at any time during their pregnancy appeared to be at significantly lower risk of inadequate numbers of visits than women with continuous private coverage (adjusted OR=0.48, 95% CI=0.34, 0.69, for Medi-Cal beginning in the first trimester and adjusted OR=0.56, 95% CI=0.38, 0.82, for Medi-Cal beginning in the second or third trimester).

DISCUSSION

During 1994–1995, about 5 years after implementation of major Medicaid eligibility expansions in California, all low-income women statewide were eligible (in terms of income) for Medi-Cal during their pregnancy, and only 2% (as compared with 11% during 1990) were uninsured throughout their pregnancy. Despite this improvement in financial access to prenatal care, the findings presented here indicate that lack of insurance coverage during pregnancy remained an important problem: one fifth of low-income women had no coverage during the first trimester of pregnancy, when care should begin, and two thirds of these women had untimely initiation of care.

Relative to their counterparts who had continuous private coverage, previously uninsured women who obtained either private insurance or Medi-Cal after the first trimester appeared to be at increased risk of untimely initiation. The elevated risk associated with lack of first-trimester coverage was observed even after control for a wide range of sociodemographic and other characteristics likely to reflect women's knowledge, attitudes, and motivations in regard to seeking prenatal care and coverage. These characteristics included income, age, education, parity, marital status, language, and ethnic group, along with transportation or child care problems, unplanned or unwanted pregnancy, knowledge of the importance of early prenatal care, and smoking.

Two thirds of low-income women who lacked coverage during their first trimester had untimely initiation of prenatal care; however, relatively few (about 1 in 10) women who obtained coverage during the first trimester initiated care at a point after that trimester. This latter rate was comparable to that observed among privately insured women at higher income levels[9] and met the 2000 objective that at least 90% of pregnant women receive first-trimester care.[13] Previously uninsured women who first obtained either Medi-Cal or private coverage during the first trimester of pregnancy in fact had rates of untimely care that were significantly lower than those observed among low-income privately insured women with continuous coverage, even after control for the sociodemographic and other characteristics we studied.

In regard to this finding, we speculate that uninsured women who seek coverage early in pregnancy do so expressly to obtain prenatal care; similarly, uninsured low-income women who seek care early in pregnancy are likely to be encouraged by their providers to apply for Medi-Cal coverage, in some cases at the care delivery site itself. It is important to note that the lower risk of untimely initiation was not experienced by a small subset of women; women who obtained Medi-Cal coverage during their first trimester represented more than half of all previously uninsured women who obtained Medi-Cal during pregnancy, one third of the entire Medi-Cal principal payer group, and nearly one fourth of all low-income pregnant women.

Although previously uninsured low-income women who obtained either Medi-Cal or private coverage after their first trimester were at increased risk of untimely initiation of care, they were not at higher risk of having too few visits once they began care. If lack of motivation to obtain prenatal care was the primary reason that these income-eligible uninsured women failed both to obtain Medi-Cal coverage and to initiate care early in pregnancy, one might have anticipated that those with delayed coverage also would have been less likely to have an adequate number of visits. Instead, we found that women who enrolled in Medi-Cal at any time during their pregnancy were actually at a significantly lower risk of having too few visits once they began care than were women with continuous private coverage; this may in part reflect providers recommending additional visits to previously uninsured women to compensate for an earlier lack of health care.

Given this study's observational design, it is important to acknowledge the potential role of unmeasured characteristics that might explain the observed associations between timing of coverage and timing of prenatal care initiation. Given the range of maternal characteristics and potential barriers we were able to consider, however, the overall pattern of findings indicates that timing of coverage is strongly associated with timing of prenatal care initiation and suggests that lack of timely coverage in itself is likely to have contributed at least in part to the observed risks. Our results do not permit firm causal inferences about timing of insurance coverage as an influence on receipt of health care. They do suggest, however, that efforts to remove financial barriers to prenatal care cannot be accurately

evaluated without information on the timing of women's coverage during pregnancy.

We conclude that timing of coverage must be considered in assessing associations between third-party coverage and receipt of prenatal care. Only information on principal prenatal payer is currently included in birth certificate data. On the basis of principal payer alone, one cannot distinguish women with prepregnancy Medi-Cal coverage from those who first become eligible during pregnancy; likewise, one cannot distinguish women who obtain coverage early in their pregnancy from those whose coverage is delayed. Our findings suggest that women in these groups use care differently and may experience different types of barriers.

For example, women with Medi-Cal coverage before their pregnancy were at an elevated risk of untimely prenatal care initiation, despite being insured; we examined the particular barriers experienced by this subgroup in another recently published article.[14] Principal payer information alone would have supported the conclusion that financial barriers to prenatal care had been removed among low-income pregnant women in California by 1994–1995, when only 2% of such women were uninsured throughout their pregnancy but one fifth actually lacked coverage during the critical first trimester. Earlier studies that relied solely on principal payer information, without data on when coverage began, may have led to inaccurate inferences about the importance of lack of insurance as a barrier to prenatal care. ■

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Contributors

Each of the authors was involved in designing the study, analyzing the data, and writing the paper. Each also participated in the design and conduct of the larger statewide survey from which these data were obtained.

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References

1. Gold RB, Singh S, Frost J. The Medicaid eligibility expansions for pregnant women: evaluating the strength of state implementation efforts. *Fam Plann Perspect.* 1993;25:196–207.

2. *State Coverage of Pregnant Women and Children—January 1994.* Washington, DC: National Governors Association; 1994.

3. Piper JM, Ray WA, Griffin MR. Effects of Medicaid eligibility expansion on prenatal care and pregnancy outcome in Tennessee. *JAMA.* 1990;264: 2219–2223.

4. Haas JS, Udavarhelyi IS, Norris CN, Epstein AM. The effect of providing health coverage to poor uninsured pregnant women in Massachusetts. *JAMA.* 1993; 269:87–91.

5. Piper JM, Mitchel EF, Ray WA. Expanded Medicaid coverage for pregnant women to 100 percent of the federal poverty level. *Am J Prev Med.* 1994;10: 97–102.

6. Braveman P, Bennett T, Lewis C, Egerter S, Showstack J. Access to prenatal care following major Medicaid eligibility expansions. *JAMA.* 1993;269: 1285–1289.

7. Katz SJ, Armstrong RW, LoGerfo JP. The adequacy of prenatal care and incidence of low birthweight among the poor in Washington State and British Columbia. *Am J Public Health.* 1994;84: 986–991.

8. Gazmararian JA, Arrington TL, Bailey CM, Schwarz KS, Koplan JP. Prenatal care for low-income women enrolled in a managed-care organization. *Obstet Gynecol.* 1999;94:177–184.

9. Braveman P, Egerter S, Marchi K. The prevalence of low income among childbearing women in California: implications for the private and public sectors. *Am J Public Health.* 1999;89:868–874.

10. Kotelchuck M. An evaluation of the Kessner Adequacy of Prenatal Care Index and a proposed adequacy of care utilization index. *Am J Public Health.* 1994;84:1414–1420.

11. *SAS Proprietary Software, Release 6.12.* Cary, NC: SAS Institute Inc; 1996.

12. *SUDAAN: Software for Statistical Analysis of Correlated Data, Release 7.11.* Research Triangle Park, NC: Research Triangle Institute; 1997.

13. *Healthy People 2000 Review, 1997.* Hyattsville, Md: National Center for Health Statistics; 1997.

14. Braveman P, Marchi K, Egerter S, Pearl M, Neuhaus J. Barriers to timely prenatal care among women with insurance: the importance of pre-pregnancy factors. *Obstet Gynecol.* 2000;95:847–880.